

Brain Wave record system
For
NeuroSky MindSet
MindWave
user's manual

Introduction

The MindRecord user's manual is designed to help you quickly get started using MindRecord.

Please read through the user's manual carefully before operating the software.

1-1. Purpose of the software

MindRecord is intended to record, recall , store brain wave signals from NeuroSky MindSet. This device is not intended to substitute for a hospital diagnostic brain wave monitor system. This program is not also intended for recording and transmission of user's brain wave signal simultaneously.

1-2. System requirements

To install and use MindRecord software, your computer system must meet requirement.

- Operating system : Windows 2000/XP or later
- CPU : core 2 duo and above
- Memory : 2GB and above
- Hard disk capacity : 160GB and above
- IO : Universal Serial Bus(USB2.0)
- DPI of screen : 1024 x 768

- DirectShow Camera (USB Web camera and so on)

* **Camera is not always required for this software.**

1-3 Software installation instruction

The following instructions will guide you through installing the MindRecord software.

1. Open “setup.exe” at MindRecord installer.
2. The dialog box of installer will appear. Follow the on-screen instruction to complete installation.

1-4. The other preparation

Before execute MindRecord software, install neuroSky MindSet driver and then check hardware operating.

If you want to record Video , install camera driver and then check hardware operating.

For **Windows Vista/7**

If a program that you are trying to run is giving you a ***Access Denied or No Permission type error***, then running it as an administrator can usually give the program the permission it needs to run properly.

The way to set “Run a program as an administrator”

- 1.Right click on the program shortcut or program .exe file, then click on Properties, and on the Compatibility tab.
- 2.Right click the program icon and select the option to "Run as administrator"

See screen shot below.



About Video codec

Microsoft **Windows Media Video 9 VMC** is recommended.

It is tested that it has good image quality and reasonable compression.

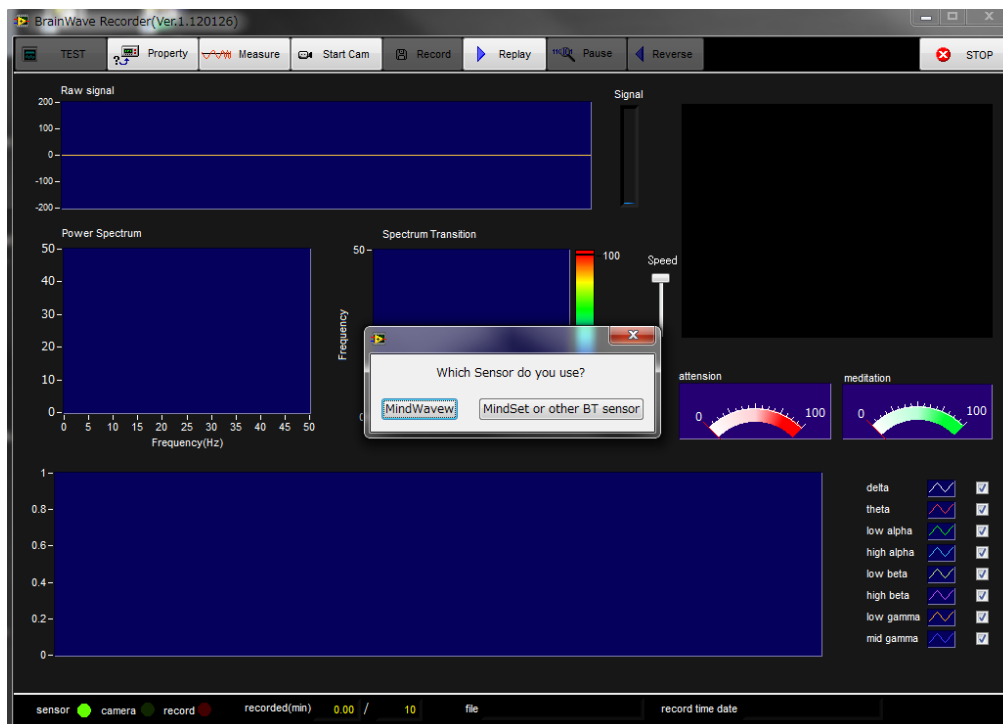
If you don't have Windows Media Video 9 VMC on your PC, you can download free form Microsoft web site.

Please refer Microsoft web site in detail.

Software operations

2-1. MindSet start

Press the power button of MindSet then Bluetooth on.



**If you are using MindWave and set MindWave USB adapter to PC, BlueTooth is not required but select MindWave sensor here.*

2-2. Main Panel

Start MindRecord software.

The main panel of software will appear.(fig2-1)

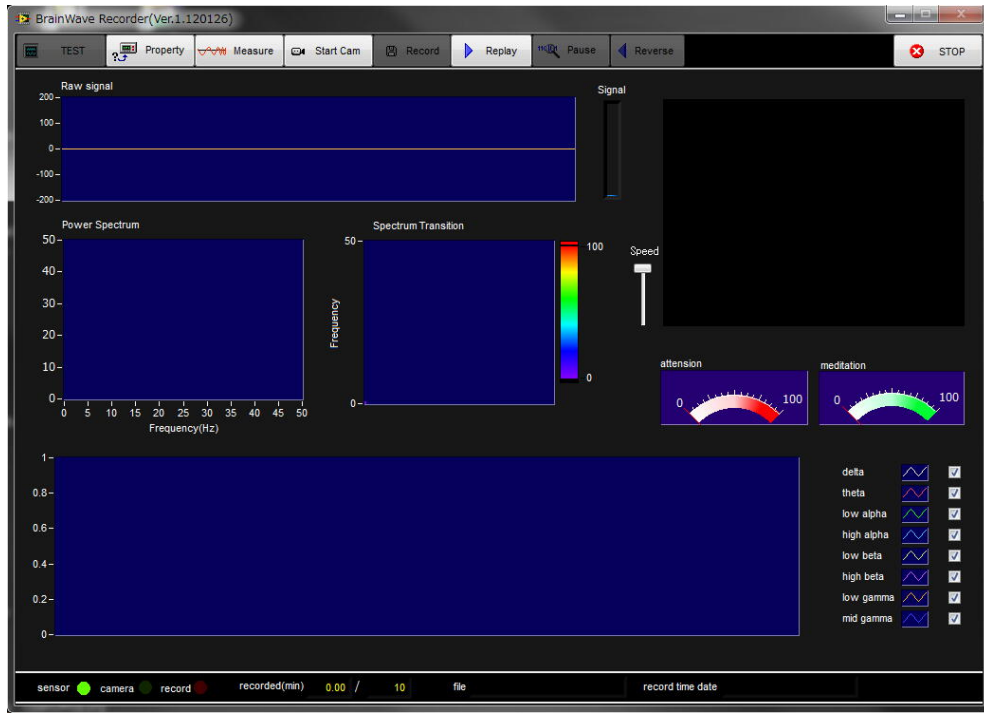


Fig.2-1 main panel

If MindSet is connected normally, sensor indicator turns bright.

Controls

Measure button	: start and stop brain wave signal from MindSet monitor.
Record button	: start and stop brainwave signal and video (if needed) record.
Replay button	: start and stop stored record playback to screen.
Speed slider	: change playback speed.
Pause button	: pause playback.
Reverse button	: backward playback.
Start Cam button	: start and stop camera monitor.(only when camera is connected)
TEST/Property button	: change front panel function.
STOP button	: finish this software.
Display	
sensor indicator	: show MindSet communication status.
record indicator	: show recording status.
Raw graph	: display raw signal.

Power spectrum graph : display power spectrum of raw signal displayed on raw graph.

Spectrum transition graph: display spectrum time shift transiton.

Signal bar graph : show signal quality from MindSet.

Attention : show attention level generated by MindSet.

Meditation : show meditation level generated by MindSet.

Image display : display camera output.

Delta-gamma graph : display EEG data generated by MindSet.

Record time date : time date of measurement or playback record.

File : show record file name.

Recorded : show recorded file length(minutes).

2-3. Measure Brain wave signal

Press Measure button once to start measure brain wave.(Fig2-2)

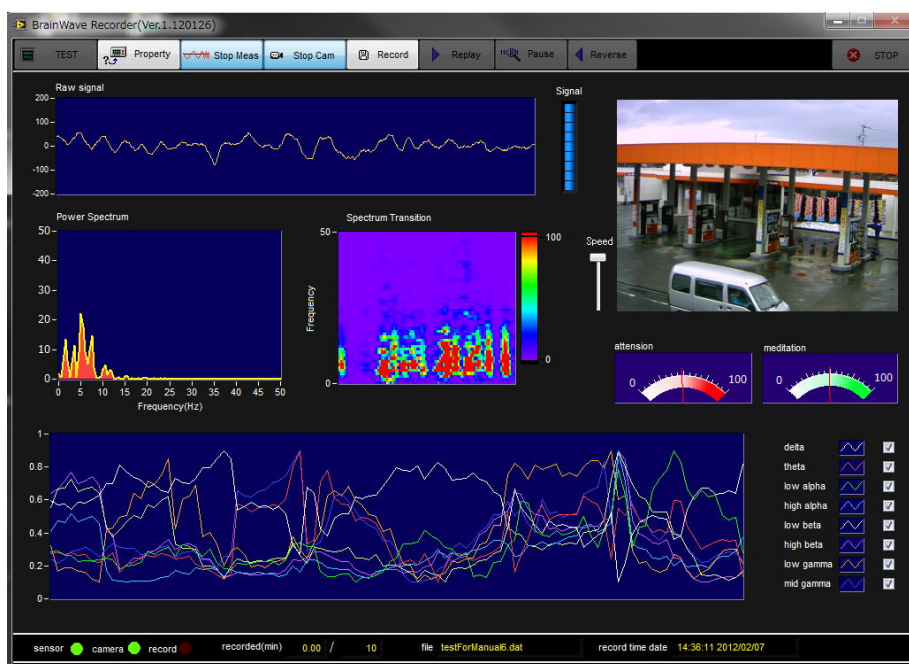


Fig.2-2 main panel when monitor brain wave and video

2-4. Store brain wave and video (If required)

Press Record button to store brain wave and video signal to disk files.(fig.2-3)

This function (store data) is available when brain wave is measured.

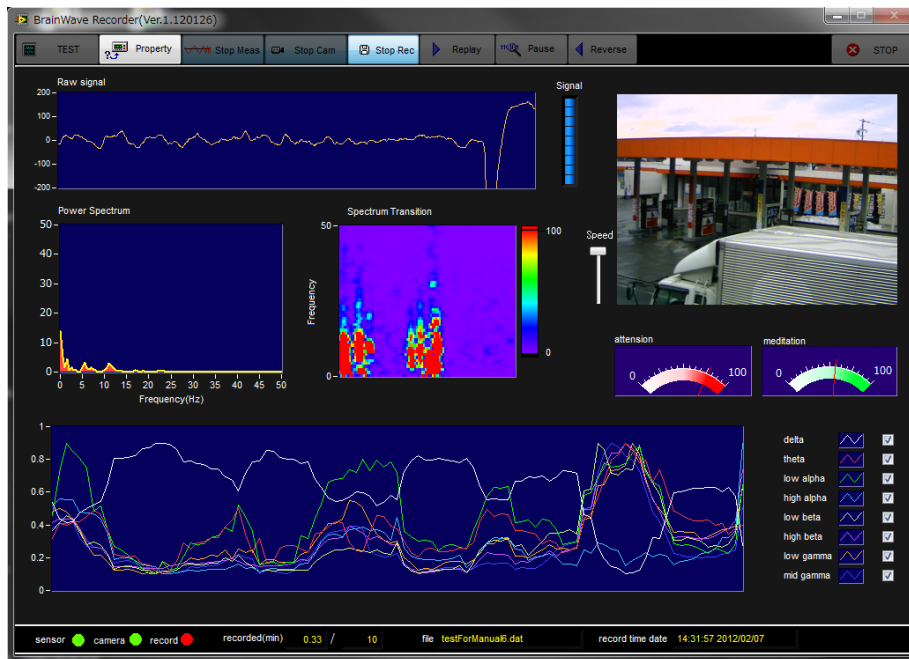


Fig.2-3 main panel when store brain wave and video

If immediate start is selected on property panel, data record is start immediately. If immediate start is not selected, data record is start at delay action time you set automatically. And record is stop at file length you set. But you can stop record process manually before auto stop sequence.

***all data stored to file are raw!**

2-5. Playback stored file

Press Playback button and select stored file on file dialog box to playback stored data file. (fig.2-4)

This function is available when measurement and camera monitor are off.

When playback is going on , you can change playback speed , direction (FWD , BWD) and pause to set each control buttons.

You also change playback point using slider indicated playback point. Drag slider then slide position you want to move.

If playback is paused, you can make CSV file for spread sheet and bitmap file of display data to press “save disp” button then set csv file name on file dialog box. This button is showed while playback is paused. (Fig.2-5)

Fig.2-6 shows bitmap saved pause image.

***Playback is not start when “Playback” button is pressed while “Pause” button is ON !**

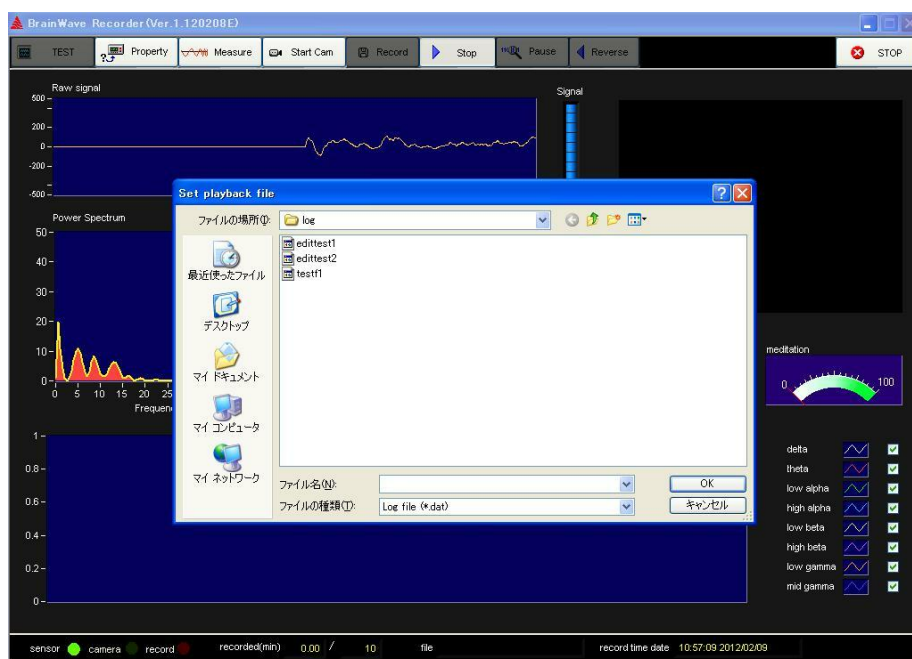


Fig.2-3 playback stored file

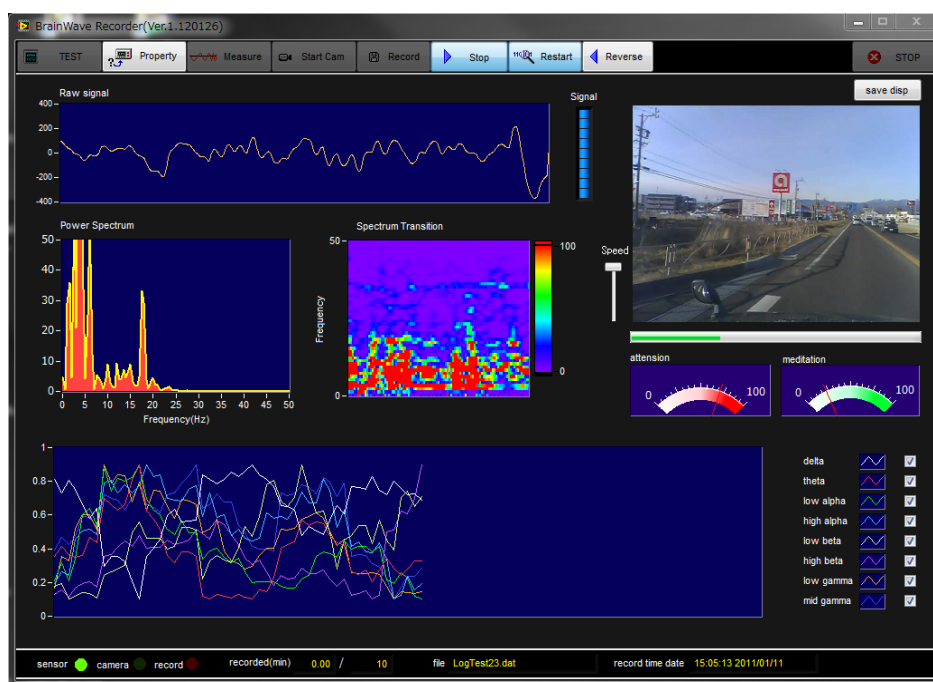


Fig.2-5 save display data to CSV file and bitmap

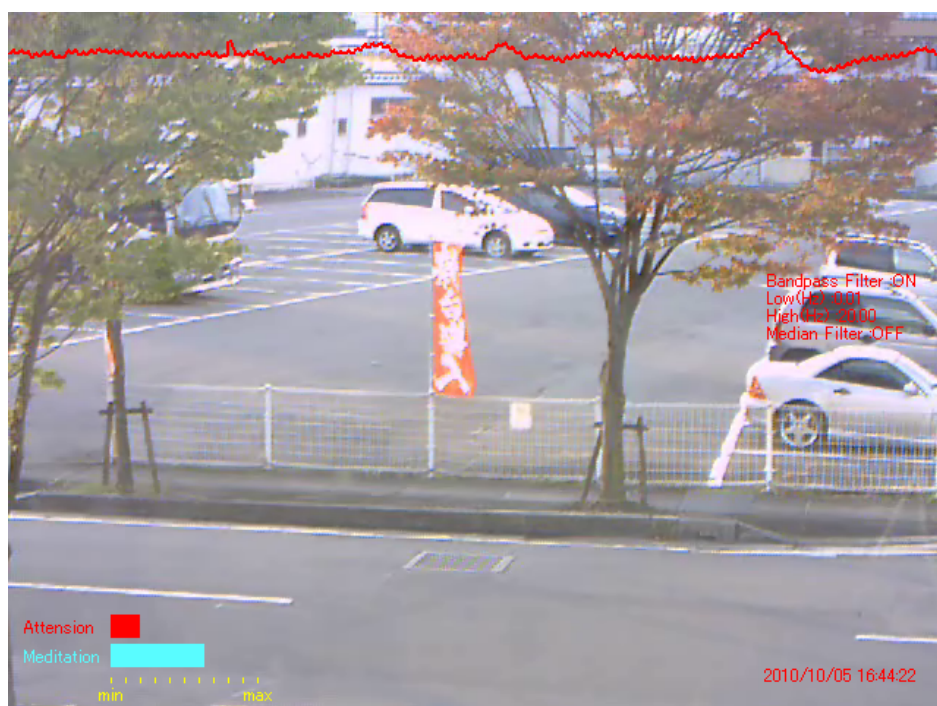


Fig.2-6 bitmap image saved when playback is paused

2-6. Measurement property

Select property button on main panel , you can set measurement property .(Fig2-7)

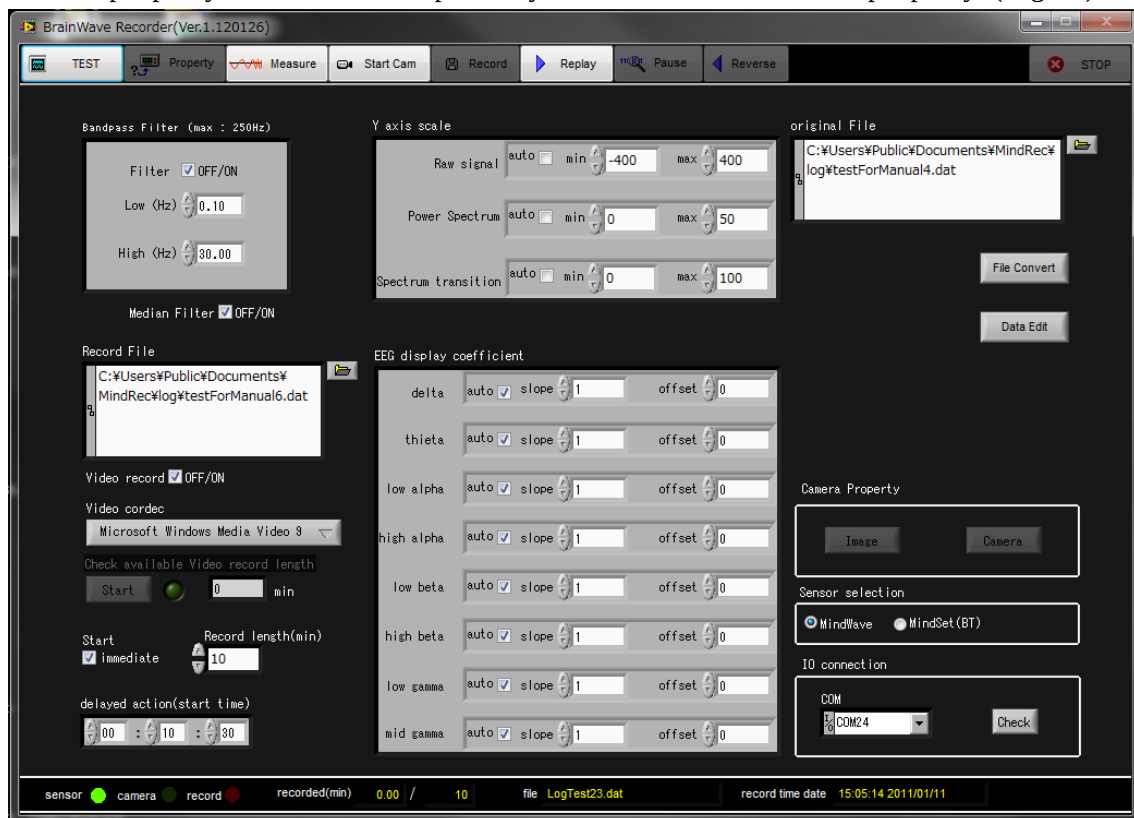


Fig.2-7 property panel

Controls

Filter : Select band pass filter is effective or not effective for display.

Low : Set low cut frequency of band pass filter.

High : Set high cut frequency of band pass filter.

Median filter : Select median filter is effective or not effective.

Record file : Set file name to store brain wave signal.

- Video file (avi) name is same as record file (csv) name except file extension.
- Reference button displayed right side is useful to set new file name.

Video record : Select store video signal with brain wave signal or not.

Video codec : Select video codec for avi file.

***displayed codec are installed codec in your computer, But not all codec are available.**
Please verify codec you want to use before store long record.

Start Button : Check available Video record time for setting record length.
About 10 second after pushing start button, the available video record time is displayed.

**The available Video record time is standard. This time length vary each time even if you select same codec. Difference is cased by captured image type.*

Start check box : Select start immediate or start at delay time you set.

Delayed action : Set delayed action time.

Record length : Set record length in minutes.

*** If record length is zero, record is not stop until you stop manually.**

Camera property : Set camera and image property you use.

Y axis scale : Set graph Y axis minimum and maximum. *When auto is selected , These minimum and maximum values are ignored.*

EEG display coefficient : Set slope and offset for display scale.

Original file path : Set original file name to make csv file and cut off file.

File convert button : Make csv file from stored RAW file.

File edit button : Make new cut off data file from original RAW file.

Sensor selection : Select sensor you use before check new com port.

COM : Set COM port manually.

Check button : Check selected COM port is available or not.

2-7 Stored record to csv (text format for the other software like Microsoft EXCEL) file

Set original file path to original file path control on property panel then Press “File convert” button to make csv file from stored record.(Fig.2-8)

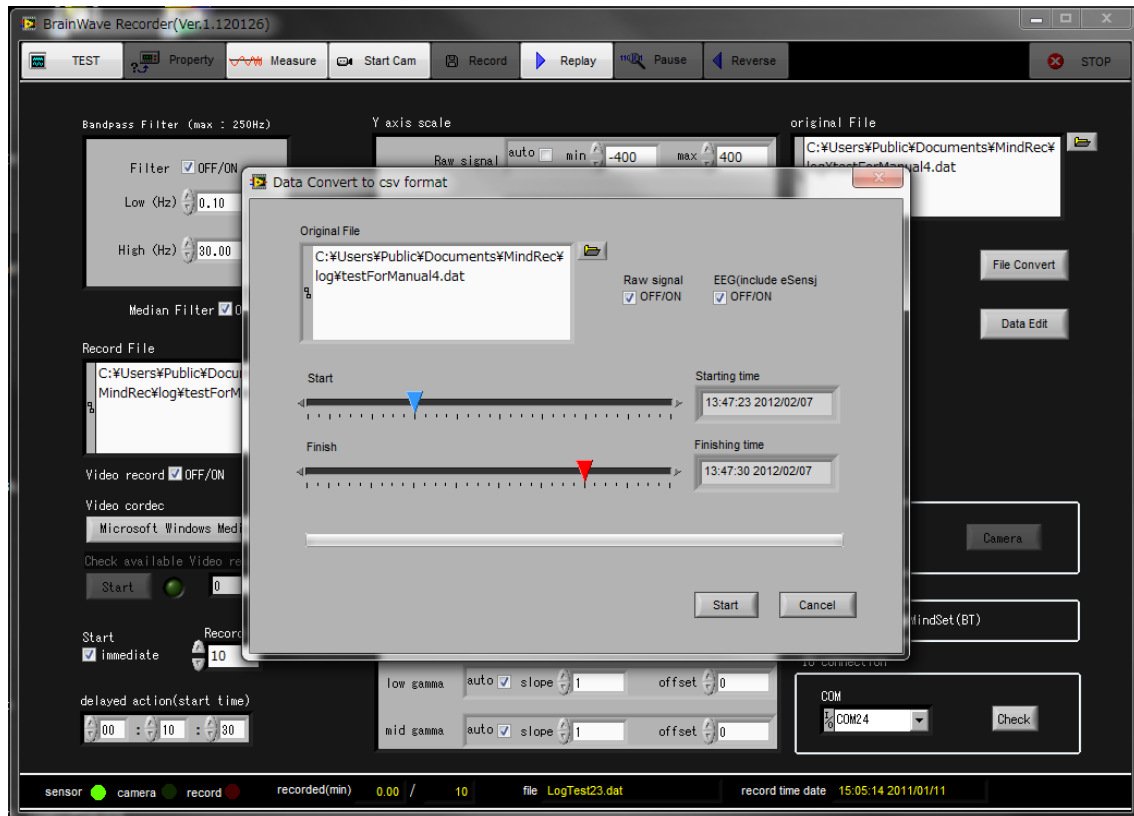


Fig.2-8 File convert dialog box

Controls

Original File : Selected original file path. You can set another file path here.

RAW check box : Select add raw data as csv item or not.

EEG check box : Select add EEG data as csv item or not.

Start slider : Set cut off start point of original record.

Finish slider : Set cut off finish point of original record.

Start button : Start making csv file.

Cancel button : Cancel making csv file process.

Display

Starting time : Show current cut off starting time date on original record.

Finishing time : Show current cut off finishing time date on original record.

Press “START” button to make csv file.

File dialog box is appear. Set new csv file path then press “OK” button on file dialog box,

2-8. Make cut off (some part of original record) record file

Set original file path to original file path control on property panel then Press “File Edit” button to make cut off file from stored record.(Fig.2-9)

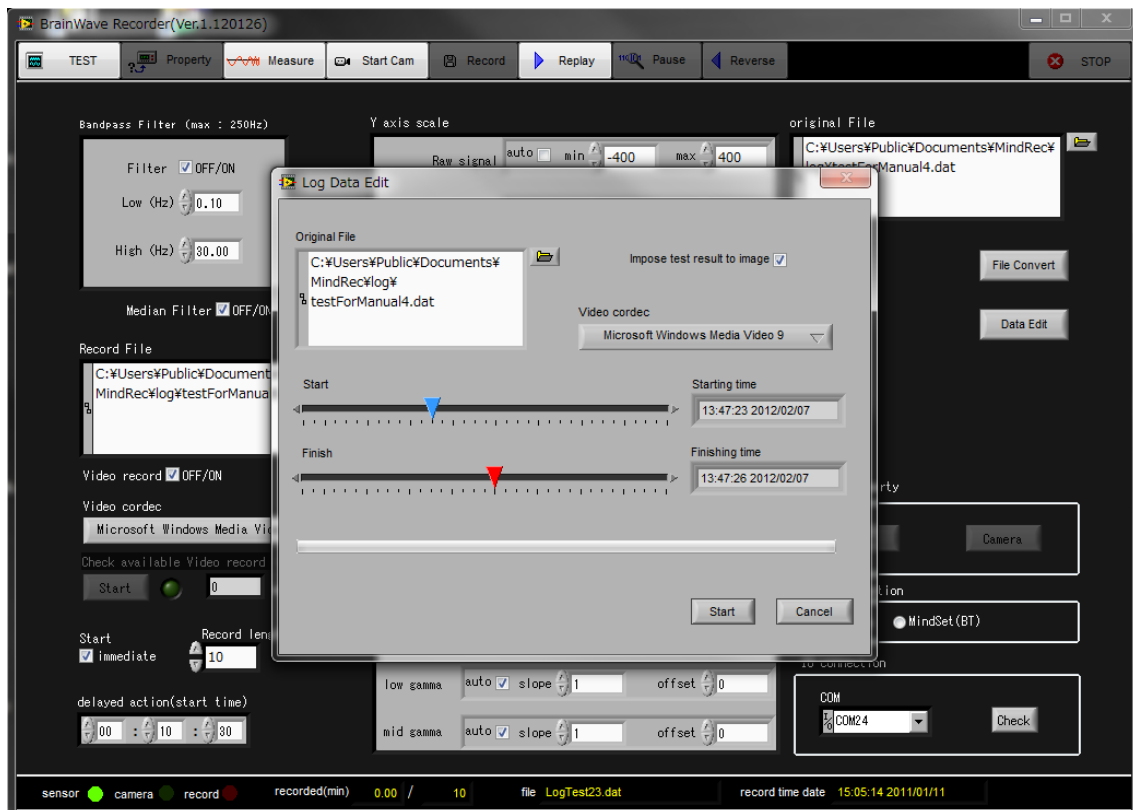


Fig.2-9 File Edit dialog box

Controls

- | | |
|------------------|--|
| Original File | : Selected original file path. You can set new file path here. |
| Impose check box | : Select add measurement information to video image or not. |
| Video codec | : Select video codec for new cut off file. |
| Start slider | : Set cut off start point of original record. |
| Finish slider | : Set cut off finish point of original record. |
| START button | : Start making cut off file. |
| CANCEL button | : Cancel making cut off file process. |

Display

- | | |
|---------------|---|
| Starting time | : Show current cut off starting time date on original record. |
|---------------|---|

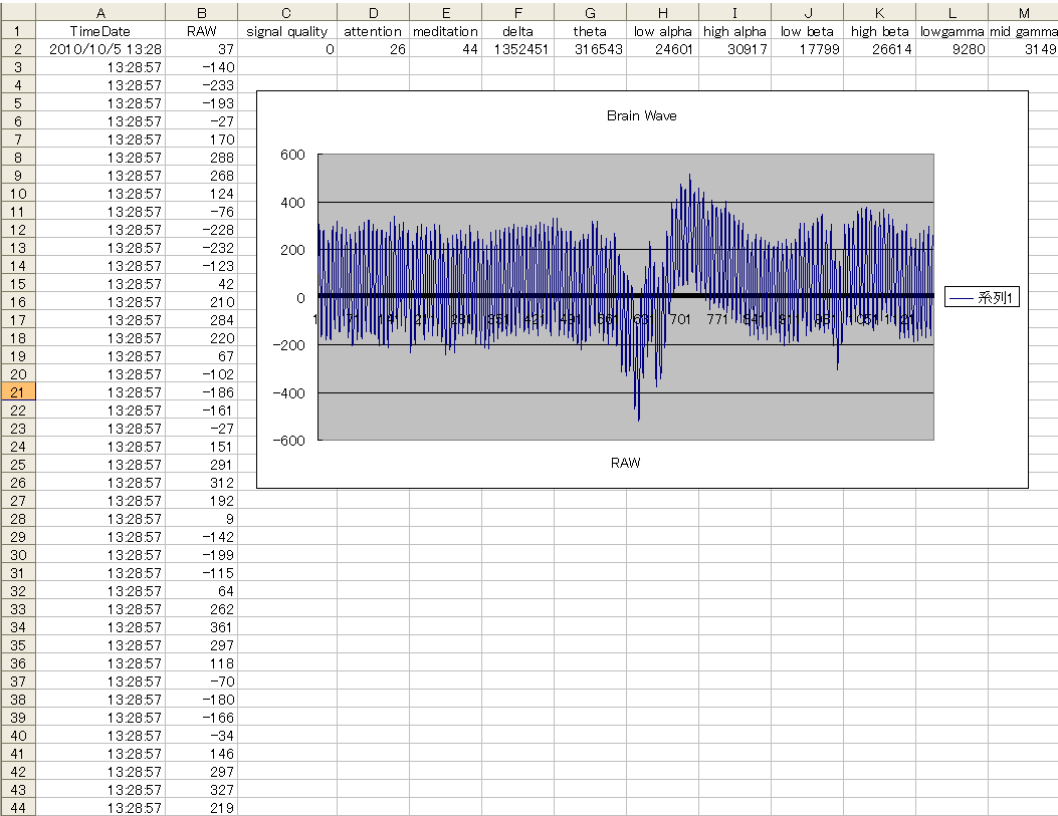
Finishing time : Show current cut off finishing time date on original record.

Press “Start” button to make cut off file.
File dialog box appear. Then set new file path then press “OK” button on file dialog box,
Generated new video file(avi) superimposed some measurement information may be able to use as independent analysis record because avi file using some codec can playback on the other software like media player.

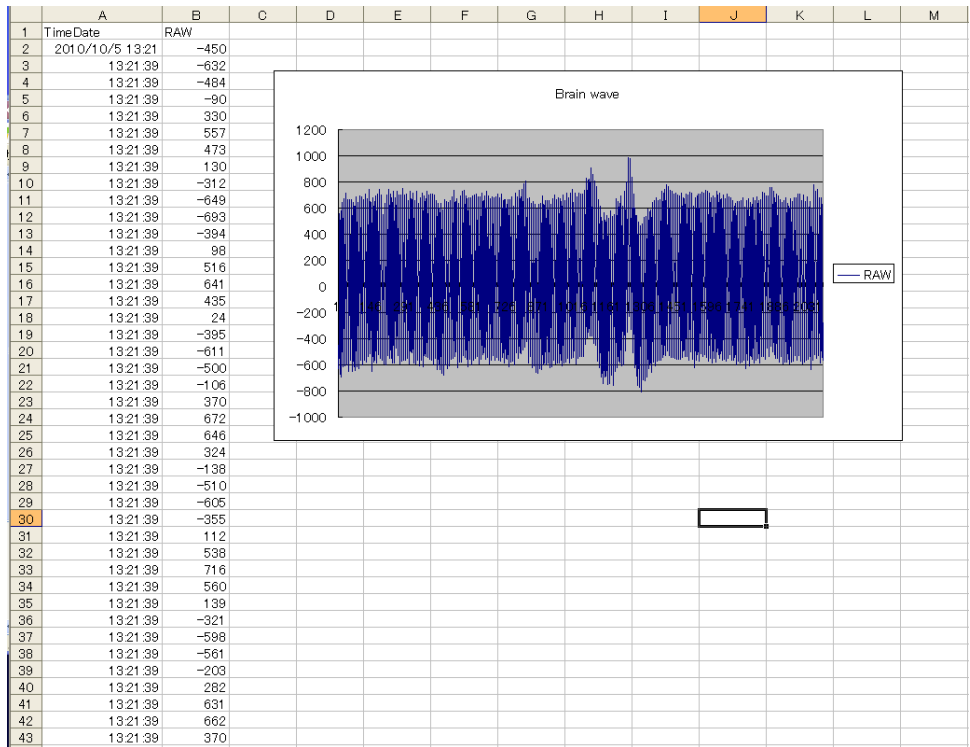
Appendix

3-1.Generated csv file samples

● RAW + EEG



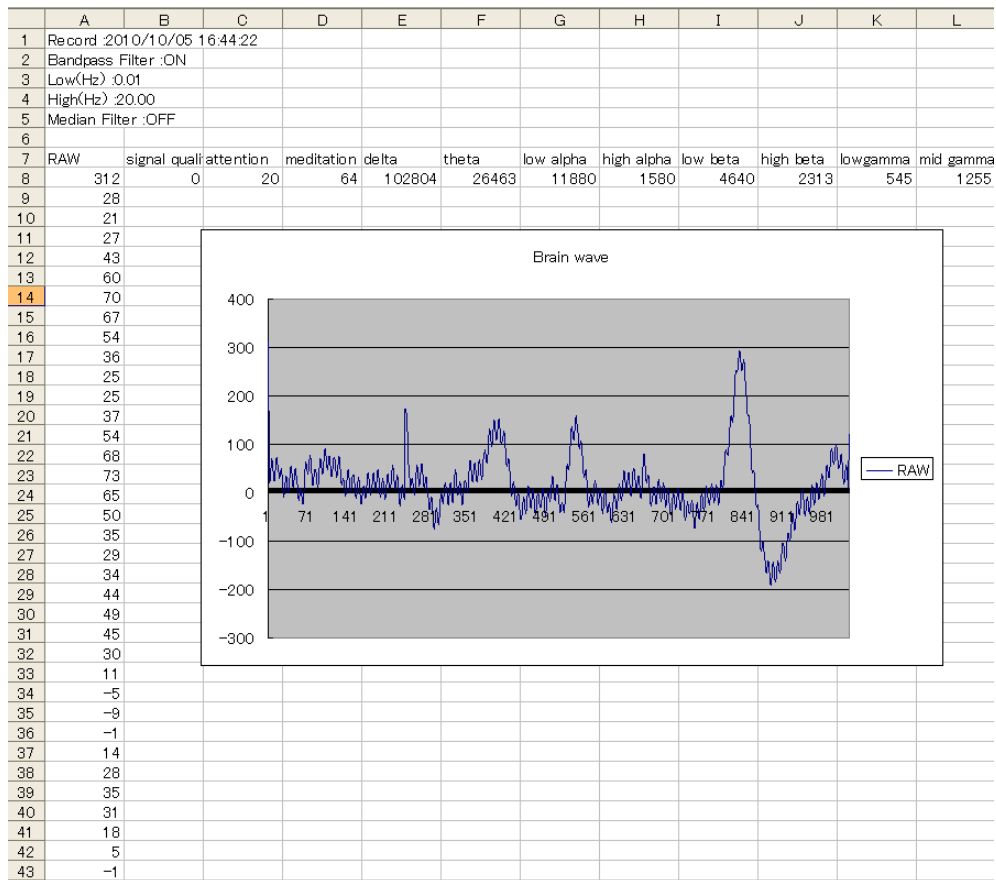
● RAW



● EEG

	A	B	C	D	E	F	G	H	I	J	K	L
1	TimeDate	signal quality	attention	meditation	delta	theta	low alpha	high alpha	low beta	high beta	lowgamma	mid gamma
2	2010/10/5 13:21	26	67	1	741250	18327	815	8656	74982	13824	12348	12866
3	13:21:23	26	67	1	132450	16395	1090	1660	10900	7133	14212	4379
4	13:21:24	26	67	1	1149839	35379	4106	1716	27900	19307	19339	29335
5	13:21:25	26	67	1	671308	42170	7828	28146	31859	29662	28550	12814
6	13:21:26	26	67	1	207140	37222	2099	4568	7205	6214	13313	2559
7	13:21:27	26	67	1	863163	66016	4759	5900	40740	21528	18433	25378
8	13:21:28	26	67	1	822820	8377	273	7631	41122	10186	13389	14143
9	13:21:29	26	67	1	163478	22928	1849	3880	12208	13061	15484	4996
10	13:21:30	26	67	1	782400	9708	3883	12084	14344	9951	14438	40644
11	13:21:31	26	67	1	690327	30184	3856	4680	57632	26687	5233	8825
12	13:21:32	26	67	1	143494	38199	1678	4934	3461	4091	2968	5039
13	13:21:33	26	67	1	1001859	22135	6055	10173	43981	27342	2126	2881
14	13:21:34	26	67	1	1114250	65013	8942	12137	34337	27048	12156	12981
15	13:21:35	26	67	1	933373	53586	8834	9509	29415	22494	33510	16775
16	13:21:36	26	67	1	490363	14968	3091	4672	25847	15666	1196	1437
17	13:21:37	0	70	1	75909	11004	491	2163	570	1584	587	354
18	13:21:38	0	69	3	918577	64143	12154	13707	49093	21657	4583	3264
19	13:21:39	26	69	3	477725	30273	3803	3118	32521	6942	8093	1856
20	13:21:40	26	69	3	786308	6880	1333	9284	17733	24648	2374	1243
21	13:21:41	26	69	3	1215035	3545	846	2499	19755	17890	1022	1379
22	13:21:42	26	69	3	177942	4549	903	1292	7143	7513	336	546
23	13:21:43	26	69	3	586826	42166	1354	11962	21177	29533	2939	1608
24	13:21:44	26	69	3	1120383	33363	5935	8665	18270	23094	1154	1039
25	13:21:45	26	69	3	731788	7769	7223	4166	13989	20489	2209	3255
26	13:21:46	26	69	3	698145	30041	1158	1181	32241	28345	1707	2405
27	13:21:47	26	69	3	796387	20907	10740	2077	18253	22912	3178	1572
28	13:21:48	26	69	3	1708108	88036	20189	26600	17950	18133	30355	22868
29	13:21:49	26	69	3	590975	8919	2046	2297	22386	26294	1665	977
30	13:21:50	26	69	3	225870	1351	499	1197	2632	8218	241	359
31	13:21:51	26	69	3	621287	16531	1524	5739	12200	24292	1549	937
32	13:21:52	26	69	3	675722	4680	1158	1997	20746	24893	1956	790
33	13:21:53	26	69	3	235710	1246	299	706	2514	8110	217	313
34	13:21:54	26	69	3	997900	45826	3039	3626	9914	28442	1502	928
35	13:21:55	26	69	3	813156	23193	4649	3613	21645	21512	3504	1424
36	13:21:56	26	69	3	234687	1081	348	930	2080	6345	319	491
37	13:21:58	26	69	3	682453	9184	2724	1480	20662	19989	1151	1192
38	13:21:59	26	69	3	217585	997	126	963	3725	7475	405	283
39	13:22:00	26	69	3	642287	10142	1320	3786	12709	21838	1178	1086
40	13:22:01	26	69	3	753673	10878	2578	2815	9512	20893	2057	1132
41	13:22:02	26	69	3	1025399	11944	3257	3989	19002	27117	1108	1822
42	13:22:03	26	69	3	747821	23351	237	6962	15543	25551	982	1353
43	13:22:04	26	69	3	608559	16964	2686	2663	20587	23284	2443	986
44	13:22:05	26	69	3	243033	2180	1526	825	3890	7528	374	340

● Displayed data at playback



● *Graphs on spread sheet is not generated automatically.*

Contact information

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NDT can make full customized software for NeuroSky MindSet. Contact us!